

REMARKS

Favorable reconsideration is respectfully requested.

Upon entry of the above amendment, the claims will be 41, 43 to 45, 48 to 52 and 54 to 55.

The above amendment incorporates the features of claims 46 and 47 into main claim 41.

Further, claim 41 as above amended also recites that the aqueous acidic treating liquid of step a) has a pH of 1.5 to 2.5 and a temperature of from 30 to 50°C, support for which is evident from the first full paragraph on page 31 of the present specification.

The significance of this amendment will become further apparent from the remarks below.

With regard to the objection to claim 51 as a substantial duplicate of claim 49, please note that claim 49 recites reduction cleavage using sulfites and claim 51 recites reductive cleavage using sodium sulfites. Thus, claim 51 is not a substantial duplicate of claim 49.

Turning to the Official Action, claims 41 to 55 have been rejected under 35 U.S.C. 103(a) as being obvious over Kondo et al. (U.S. 4,533,359) in view of Thorsen (U.S. 4,189,303).

This rejection is respectfully traversed.

The present invention relates to a modified animal fiber having a surface morphology that is substantially the same as that produced by the fiber in its unmodified form and further, which exhibits excellent shrink-proofing properties and pilling resistance relative to the untreated fiber.

The foregoing is achieved by a three step method in which the first step is an oxidation under specific conditions resulting in a state rich in mono-oxidized products i.e. primary oxidation. The nature of the mono-oxidized products is evident from the disclosure at page 27, lines 16 to 21.

In a second step, the primary or mono-oxidized product is further oxidized into di, tri, or tetra-oxidized products. Again, see page 27.

This is achieved with blowing ultrafine bubbles of an ozone/oxygen mixture into the reaction mixture.

In a third step, the higher (di-, tri- or tetra-) oxidized products are subjected to reductive cleavage.

Kondo et al. on the other hand relates to a process for descaling animal fiber which comprises surface-oxidizing the animal fiber with an oxidizing agent and subsequently treating said fiber with a proteolytic enzyme in a saturated or nearly saturated aqueous inorganic-salt solution (see, for example, claim 1). Thereby the aim of elimination of scales without any material damage to the animal fibers themselves can be achieved (col. 1, lines 25 to 27).

As a result, shrink-proofing is imparted to the animal fiber. However, water repellence possessed by the fiber in its unmodified form completely disappears.

The oxidation process in Kondo et al. is disclosed in column 1, line 57 to column 2, line 15 and is completely unsuggestive of the first step oxidation of the present process by pad steaming of the fiber with an aqueous, acidic solution of oxidizing agent (see page 22, line 26 to page 23, line 23).

Kondo et al. discloses the use of a reducing agent. However, the reducing agent is used to eliminate oxidizing reagent remaining in the inside of the fibers. See column 2, lines 40 to 45. In contrast, in the present invention, shrink resistance can be imparted to the animal fiber by the reduction process and, of course, Kondo makes no mention of a further oxidation with an ozone/oxygen mixture prior to reduction.

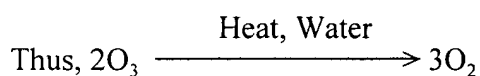
Please refer to attached Rule 132 Declaration of K. Nakase, the fifth named inventor herein, which shows the product of the present invention is unobviously distinguished from that of Kondo '359 in numerous physical respects and properties.

The rejection states that Thorsen (U.S. 4,189,303) illustrates proteinaceous fibers contacted with a steam-ozone mixture (page 5, line 6).

However, Thorsen employs, as his invention, an aqueous ozone solution in an oxidation process instead of the steam-ozone mixture which is disclosed as disadvantageous. Therefore, a person skilled in the art would not adopt the steam-ozone mixture oxidation process in accordance with Thorsen (column 1, line 45 to column 2, line 16) for any reason, no less to be employed in place of or in addition to Kondo's oxidation.

Even if a person skilled in the art would apply such steam-ozone mixture oxidation to Kondo et al., the process and the product are completely different from the present invention.

In addition, please note that the steam-ozone process of Thorsen (see U.S. 4,214,330) is carried out only by ozone oxidation treatment to impart the shrink-proofness to animal fibers and that ozone itself is decomposed by the action of steam, i.e. heat and water to produce oxygen gas, so that the reaction to animal fibers with active ozone gas is limited significantly and as a result, shrink-proofing of the animal fibers with the steam-ozone by Thorsen's process cannot be achieved.



(The rejection states "see col. 4, ln. 1-10. In example 1-3" on page 5, line 5 of the Official Action, which apparently refers to Thorsen (U.S. 4,214,330), not cited by the rejection.)

As above discussed, Kondo et al. discloses a process for descaling animal fiber through a surface-oxidizing process of the animal fiber with an oxidizing agent, a treatment with a reducing agent to eliminate the remaining oxidizing agent and subsequently a treating process of said fiber with a proteolytic enzyme in a saturated or nearly saturated aqueous inorganic-salt solution.

However, even if the oxidizing process in Kondo et al. is replaced by an ozone oxidizing process and the treating process of said fiber with a proteolytic enzyme of Kondo is omitted (please note that such replacement and construction would never be done by a person skilled in

the art), a mere ozone oxidation cannot achieve a high degree of shrink-proofing. See Comparative Example 2 at page 43, lines 21 to 28 and Table 1 on page 46 of the present specification. A two-step oxidation and a reduction step as specified in the present invention are needed to give a modified fiber with a high degree of shrink-proofing and water repellency. See Example 1 and Table 1 on page 46.

For the foregoing reasons, it is apparent that the rejection on Kondo in view of Thorsen is untenable and should be withdrawn.

No further issues remaining, allowance of this application is respectfully requested.

If the Examiner has any comments or proposals for expediting prosecution, please contact undersigned at the telephone number below.

Respectfully submitted,

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February 3, 2005